Article title: Cointegration FDI to Economy Growth: -

Authors: Ivan Sudibyo[1]

Affiliations: University of Indonesia[1]

Orcid ids: 0000-0001-6394-3813[1]

Contact e-mail: ivansudibyo14@gmail.com

License information: This work has been published open access under Creative Commons Attribution License <http://creativecommons.org/licenses/by/4.0/>, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Conditions, terms of use and publishing policy can be found at <https://www.scienceopen.com/>.

Preprint statement: This article is a preprint and has not been peer-reviewed, under consideration and submitted to ScienceOpen Preprints for open peer review.

Links to data: <https://osf.io/5vq3r>

Funder: -

DOI: 10.14293/S2199-1006.1.SOR-.PP8RPOJ.v1

Preprint first posted online: 29 December 2021

Keywords: Cointegration, FDI, Economy Growth

Cointegration FDI to Economy Growth

Ivan Sudibyo

email: ivansudibyo14@gmail.com

Abstract

The contribution of foreign direct investment to economic growth is perhaps one of the most studied topics in academic research over the past five decades. However, few studies have examined both the short-term and long-term effects of this impact on developing and emerging markets, particularly during times of economic uncertainty including the financial crisis. global financial crisis. This paper examines the relevant quantitative evidence on the impact of foreign direct investment (FDI) and outward foreign direct investment (OFDI) on economic growth by the regression method and the Johansen cointegration test.

The relationship between foreign direct investment (FDI) and economic growth has attracted the attention of academia and governments in developing countries. Since economic growth is one of the main goals, policies related to FDI attraction have been prioritized in the process of economic growth and development in these countries (Vo et al. 2019). Many find that FDI reduces the imbalance between saving and investment and provides the technology used to produce goods and services. In addition, FDI improves tax revenues as well as human capital (Buckley et al. 2002). From another perspective, it can be argued that FDI is one of the important factors of economic integration, as it increases long-term benefits and connections between different countries.

On the one hand, various positive effects of FDI on the economy have been discussed among scholars. FDI not only diversifies the recipient's capital structure, but also provides positive externalities such as technology and knowledge diffusion (Mansfield and Romeo 1980; Markusen and Venables 1999; Blomström et al. 1994; Caves, Richard E., 1974). Markusen and Venables (1999) stated that the effects of FDI on the home economy may operate through many different channels. Their paper provides a simple analysis of just two of these. Product market competition, through which multinationals may substitute for domestic firms, and linkage effects, through which multinationals may be complementary.

There is a wealth of theoretical and empirical literature on the relationship between foreign direct investment (FDI) and growth. Although there are many factors that determine FDI inflows into developing countries, recent empirical studies reviewed in De Mello (1997) show that one of the most important determinants of FDI inflows is into developing countries in recent years is the process of privatization and globalization of production. In addition, a number of factors, including the degree of political stability, the nature of government policy, the trade and investment regime, the openness of the host country, and the size of the market, are factors can determine FDI inflows. With the advent of liberalization, FDI has played a more important role in developing countries in recent years. The World Bank's Global Development Finance (1999) shows that FDI inflows to developing countries more than sixfold between 1990-1998 (Chakraborty and Basu, 2002).

Chakraborty and Basu (2002), focusing on the relationship between FDI and growth in India. Starting in the mid-1980s with Rajiv Gandhi's outward-looking industrialization policy, India began to liberalize its economy with the rest of the world at a rapid pace. Since the early 1990s, FDI inflows have played an increasingly important role in the economy.

Although each country has its own characteristics and strengths to utilize capital for economic growth, FDI still plays a key role in the main factors that directly affect growth. FDI is the key to global economic integration, ensuring financial stability, stimulating economic growth and improving social welfare (Borensztein et al. 1998; Nguyen et al. 2019).

The relationship between FDI and economic growth has received much attention from scholars around the world (Basu et al. 2003; Vo et al. 2019). It is widely recognized that this relationship has been studied extensively using data from a single country or a sample of several countries. Unfortunately, there is no consensus on experimental results among researchers. Regarding the country-by-country survey, Koojaroenprasit (2012) examined the impact of FDI on economic growth in Korea in the period 1980-2009. The author finds a strong positive effect of FDI on economic growth in Korea, while human capital, exports and employment also positively affect growth afterwards. Similar observations are found in Pakistan with a positive long-run effect of foreign capital inflows on economic growth (Shahbaz and Rahman 2010).

In addition to studies focusing on individual country data, various studies have been conducted using transnational data. Tiwari and Mutascu (2011) show that FDI and international trade supported the economic growth of 23 Asian countries in the period 1986-2008. More importantly, they find a profound effect of FDI on growth as an economy develops. Borensztein et al. (1998) examined the role of FDI in the economic growth of developing countries. Their findings indicate that FDI is an effective mediator between technology and economic growth. In addition, they also argue that the role of FDI will be more effective for the economy if the country concerned has high human capital. Omran and Bolbol (2003) show both a high correlation and a significant causal relationship between FDI and economic growth in Arab countries through causality test and OLS regression, respectively. They also concluded that the economic and political situation in the region is an important factor in determining the influx of FDI, along with policies that focus on the attractiveness of FDI.

Alfaro et al. (2004) affirms that FDI is one of the important factors of economic growth for 20 countries of the Organization for Economic Cooperation and Development (OECD). Furthermore, their empirical results show that in these countries, the level of financial market development is important for the relationship between FDI and economic growth. Basu et al. (2003) considered a two-way relationship between FDI and economic growth for 23 developing countries in the period 1978-1996. They find that FDI and economic growth move together in the long run or are co-integrated after accounting for heterogeneous country effects. Furthermore, their empirical results indicate that there is a two-way causal relationship between these two variables for economies with a higher degree of economic openness, but there is a one-way causality that runs from GDP to FDI for closed economies.

The research of Jyun Yi and Chih Chiang (2008) with threshold regression show that FDI can promote economic growth when the host country has achieved a certain threshold of development, initial GDP and human capital. This is perhaps indicative of the recipient countries learning and/or benefiting from foreign investors. Thus, initial GDP and human capital are important factors for FDI that are consistent with Borensztein et al. (1998).

The research of Dinh, T. T. H., et.al., (2019) can be summarized as follows. Firstly, FDI inflows can hinder a country's economic growth in the short term, but also have positive effects in the long run. Second, domestic credit to the private sector negatively affects economic growth in the short run, while money supply has been identified as having both short and long term positive effects on economic growth. In the long run, human capital, total domestic investment and domestic credit from the private sector have a positive impact of on economic growth. Therefore, it can be concluded that in the long run, foreign direct investment is an important factor in economic growth, especially for emerging and developing economies. Efforts to attract foreign direct investment should be encouraged to supplement domestic investment in low- and middle-income developing economies. However, it should be considered that policies for attracting FDI need to be formulated from a long-term perspective to maximize the positive impact of FDI on a country's economy. Policies aimed at attracting FDI at all costs in the short term will not bring fundamental benefits to the economy. Low-middle-income developing countries have tried to attract FDI in order to reap positive benefits. The impact of FDI on economic growth is not always positive as it depends on the characteristics of the investment generated by FDI, such as type, sector, scale, duration, share of domestic enterprises in the sector, etc. Governments should implement policies to improve the quality of human resources and labour skills. Since FDI is always accompanied by technology, a highly skilled workforce is required to use the new technology and create a positive technology diffusion effect.

Dierk Herzer (2008) has examined the long-run relationship between outward FDI on domestic output using panel cointegration techniques in 14 industrialized countries over the period 1971–2005. The researcher found that outward FDI has positive long-run effects on domestic output. In addition, the results show that the long-run causality is bidirectional, suggesting that increases in domestic output in turn allow firms to invest more abroad. Consequently, increased outward FDI is both a cause and a consequence of increased domestic output. Dierk Herzer (2011) examined the long-run relationship between outward FDI and domestic output for developing countries, a relationship that has not yet been explored in the literature. The researcher data cover the period 1981 to 2008 ($T = 28$) and the researcher include all developing countries for which continuous data are available, leading to a sample of 43 countries ($N = 43$). To test for cointegration, the researcher used the panel and group Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests, as well as the panel trace test developed by Larsson et al. (2001). To estimate the long-run effect of outward FDI on domestic output, the researcher use the Dynamic Ordinary Least Squares (DOLS) estimator. From the results it can be concluded that outward FDI has, in general, a positive long-run effect on domestic output in developing countries.

Apergis (2008) examines empirically the association between foreign direct investment inward and foreign direct investment outward. The author used a panel data set for 35 economies over the period 1981–2004 as well as the methodology of panel unit root and panel cointegration tests with a certain number of structural changes, the empirical findings showed that FDI inward does exhibit a significant (long-run) relationship with FDI outward.

Desbordes, R., et.al. (2019) investigated how intra- and inter-industry FDI influences the average productivity of a sample of emerging market economies. Overall, the authors find a large positive effect of intra-industry FDI on total and export related labour productivity. This result suggests that foreign firms raise the performance of their host economies through a direct compositional effect. Foreign firms tend to be larger than domestic firms; they make more intensive use of (possibly better) physical capital, human capital, and intermediates; and they have greater access to foreign markets. Hence, their greater prevalence in a given sector mechanically increases average labour productivity and export performance. In addition to improving their FDI attractiveness, governments should also ensure that they adopt policies that increase the quantity, quality, and technological level of local producers. This will leverage the benefits of FDI and sustain long-run economic development. These considerations led the Government of the PRC to introduce in 2006 and 2015, respectively, the Indigenous Innovation and Made in China 2025 policy packages to upgrade domestic manufacturing.

Keller, et.al. (2009) estimate international technology spillovers to U.S. manufacturing firms via imports and foreign direct investment (FDI) between 1987 and 1996. The results suggest that FDI leads to substantial productivity gains for domestic firms. The size of FDI spillovers is economically important, accounting for about 14% of productivity growth in U.S. firms between 1987 and 1996. FDI spillovers are particularly strong in high-tech sectors, whereas they are absent in low-tech sectors. The authors estimate positive coefficients for contemporaneous and one period lagged FDI. The FDI-size interactions are negative, and the one-year lagged estimate is significant. This suggests that smaller firms benefit more from FDI spillovers than larger firms do.

Research Methodology and data

The Researcher used Johansen Cointegration test to examine the cointegration of FDI dan OFDI to Economy Growth in Southeast Asia+3 and US. And then, the researcher analyse the variables with the regression tool. The Researcher used the data from World Bank indicators database. The following are the results;

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: USA_GDPUSD USA_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.400436	36.05381	15.49471	0.0000
At most 1 *	0.225510	12.01087	3.841466	0.0005

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.400436	24.04294	14.26460	0.0011
At most 1 *	0.225510	12.01087	3.841466	0.0005

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2020
Included observations: 48 after adjustments
Trend assumption: Linear deterministic trend
Series: USA_GDPUSD USA_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.198964	12.73479	15.49471	0.1249
At most 1	0.042528	2.085998	3.841466	0.1487

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.198964	10.64879	14.26460	0.1727
At most 1	0.042528	2.085998	3.841466	0.1487

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1982 2019
Included observations: 38 after adjustments
Trend assumption: Linear deterministic trend
Series: CHN_GDPUSD CHN_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.665789	49.80346	15.49471	0.0000
At most 1 *	0.193165	8.156173	3.841466	0.0043

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.665789	41.64729	14.26460	0.0000
At most 1 *	0.193165	8.156173	3.841466	0.0043

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1985 2020
Included observations: 36 after adjustments
Trend assumption: Linear deterministic trend
Series: CHN_GDPUSD CHN_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.584511	31.70590	15.49471	0.0001
At most 1	0.002418	0.087166	3.841466	0.7678

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.584511	31.61873	14.26460	0.0000
At most 1	0.002418	0.087166	3.841466	0.7678

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: KOR_GDPUSD KOR_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.098084	8.826207	15.49471	0.3817
At most 1 *	0.081081	3.974212	3.841466	0.0462

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.098084	4.851995	14.26460	0.7604
At most 1 *	0.081081	3.974212	3.841466	0.0462

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1974 2020
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: KOR_GDPUSD KOR_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.206810	12.92306	15.49471	0.1177
At most 1	0.042344	2.033534	3.841466	0.1539

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.206810	10.88953	14.26460	0.1598
At most 1	0.042344	2.033534	3.841466	0.1539

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: JPN_GDPUSD JPN_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.086188	4.274147	15.49471	0.8802
At most 1	0.000808	0.038011	3.841466	0.8454

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.086188	4.236136	14.26460	0.8336
At most 1	0.000808	0.038011	3.841466	0.8454

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2020
Included observations: 48 after adjustments
Trend assumption: Linear deterministic trend
Series: JPN_GDPUSD JPN_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.153934	10.03131	15.49471	0.2783
At most 1	0.040965	2.007724	3.841466	0.1565

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.153934	8.023584	14.26460	0.3763
At most 1	0.040965	2.007724	3.841466	0.1565

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: SGP_GDPUSD SGP_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.319483	18.10606	15.49471	0.0198
At most 1	0.000333	0.015663	3.841466	0.9003

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.319483	18.09040	14.26460	0.0118
At most 1	0.000333	0.015663	3.841466	0.9003

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1975 2020
Included observations: 46 after adjustments
Trend assumption: Linear deterministic trend
Series: SGP_GDPUSD SGP_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.442328	27.17935	15.49471	0.0006
At most 1	0.006847	0.316041	3.841466	0.5740

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.442328	26.86331	14.26460	0.0003
At most 1	0.006847	0.316041	3.841466	0.5740

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: THA_GDPUSD THA_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.179240	11.01881	15.49471	0.2103
At most 1	0.036245	1.735176	3.841466	0.1878

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.179240	9.283638	14.26460	0.2633
At most 1	0.036245	1.735176	3.841466	0.1878

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1978 2020
Included observations: 43 after adjustments
Trend assumption: Linear deterministic trend
Series: THA_GDPUSD THA_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.197383	9.456735	15.49471	0.3248
At most 1	4.66E-05	0.002002	3.841466	0.9609

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.197383	9.454732	14.26460	0.2503
At most 1	4.66E-05	0.002002	3.841466	0.9609

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: MYS_GDPUSD MYS_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.222740	14.16672	15.49471	0.0785
At most 1	0.048238	2.323672	3.841466	0.1274

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.222740	11.84305	14.26460	0.1167
At most 1	0.048238	2.323672	3.841466	0.1274

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1977 2020
Included observations: 44 after adjustments
Trend assumption: Linear deterministic trend
Series: MYS_GDPUSD MYS_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.384010	21.44038	15.49471	0.0056
At most 1	0.002752	0.121275	3.841466	0.7276

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.384010	21.31910	14.26460	0.0033
At most 1	0.002752	0.121275	3.841466	0.7276

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: PHL_GDPUSD PHL_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.369118	23.95213	15.49471	0.0021
At most 1	0.047802	2.302190	3.841466	0.1292

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.369118	21.64994	14.26460	0.0029
At most 1	0.047802	2.302190	3.841466	0.1292

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1980 2020
Included observations: 41 after adjustments
Trend assumption: Linear deterministic trend
Series: PHL_GDPUSD PHL_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.409326	21.61530	15.49471	0.0053
At most 1	0.000710	0.029133	3.841466	0.8644

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.409326	21.58616	14.26460	0.0029
At most 1	0.000710	0.029133	3.841466	0.8644

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1988 2019
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: VNM_GDPUSD VNM_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.522729	29.06748	15.49471	0.0003
At most 1 *	0.155227	5.398002	3.841466	0.0202

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.522729	23.66947	14.26460	0.0013
At most 1 *	0.155227	5.398002	3.841466	0.0202

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1999 2019
Included observations: 16 after adjustments
Trend assumption: Linear deterministic trend
Series: VNM_GDPUSD VNM_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.748893	22.26311	15.49471	0.0041
At most 1	0.009524	0.153115	3.841466	0.6956

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.748893	22.11000	14.26460	0.0024
At most 1	0.009524	0.153115	3.841466	0.6956

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1973 2019
Included observations: 47 after adjustments
Trend assumption: Linear deterministic trend
Series: IDN_GDPUSD IDN_FDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.268643	17.82066	15.49471	0.0219
At most 1	0.064159	3.116564	3.841466	0.0775

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.268643	14.70410	14.26460	0.0426
At most 1	0.064159	3.116564	3.841466	0.0775

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sample (adjusted): 1983 2020
Included observations: 38 after adjustments
Trend assumption: Linear deterministic trend
Series: IDN_GDPUSD IDN_OFDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.318851	14.59643	15.49471	0.0680
At most 1	0.000143	0.005416	3.841466	0.9406

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.318851	14.59101	14.26460	0.0444
At most 1	0.000143	0.005416	3.841466	0.9406

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Linear regression

Dependent Variable: USA_GDPUSD

Method: Least Squares

Sample (adjusted): 1970 2019

Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
USA_FDI	38.03458	2.963745	12.83328	0.0000
C	3.57E+12	5.80E+11	6.161976	0.0000
R-squared	0.774323	Mean dependent var		8.80E+12
Adjusted R-squared	0.769621	S.D. dependent var		6.07E+12
S.E. of regression	2.91E+12	Akaike info criterion		60.27871
Sum squared resid	4.08E+26	Schwarz criterion		60.35520
Log likelihood	-1504.968	Hannan-Quinn criter.		60.30784
F-statistic	164.6931	Durbin-Watson stat		0.889042
Prob(F-statistic)	0.000000			

Dependent Variable: USA_GDPUSD

Method: Least Squares

Sample (adjusted): 1970 2020

Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
USA_OFDI	28.76789	4.077593	7.055115	0.0000
C	5.01E+12	8.45E+11	5.935986	0.0000
R-squared	0.503921	Mean dependent var		9.04E+12
Adjusted R-squared	0.493797	S.D. dependent var		6.25E+12
S.E. of regression	4.44E+12	Akaike info criterion		61.12182
Sum squared resid	9.68E+26	Schwarz criterion		61.19758
Log likelihood	-1556.606	Hannan-Quinn criter.		61.15077
F-statistic	49.77465	Durbin-Watson stat		0.658647
Prob(F-statistic)	0.000000			

Dependent Variable: CHN_GDPUSD

Method: Least Squares

Sample (adjusted): 1979 2019

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CHN_FDI	40.22781	3.512758	11.45192	0.0000
C	-9.22E+10	4.53E+11	-0.203290	0.8400
R-squared	0.770786	Mean dependent var		3.43E+12
Adjusted R-squared	0.764908	S.D. dependent var		4.40E+12
S.E. of regression	2.13E+12	Akaike info criterion		59.66233
Sum squared resid	1.77E+26	Schwarz criterion		59.74592
Log likelihood	-1221.078	Hannan-Quinn criter.		59.69277
F-statistic	131.1464	Durbin-Watson stat		0.282652
Prob(F-statistic)	0.000000			

Dependent Variable: CHN_GDPUSD

Method: Least Squares

Sample (adjusted): 1982 2020

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CHN_OFDI	76.21120	5.200216	14.65539	0.0000
C	1.01E+12	3.58E+11	2.836293	0.0074
R-squared	0.853047	Mean dependent var		3.97E+12
Adjusted R-squared	0.849075	S.D. dependent var		4.75E+12
S.E. of regression	1.85E+12	Akaike info criterion		59.37668
Sum squared resid	1.26E+26	Schwarz criterion		59.46199
Log likelihood	-1155.845	Hannan-Quinn criter.		59.40729
F-statistic	214.7805	Durbin-Watson stat		0.793899
Prob(F-statistic)	0.000000			

Dependent Variable: KOR_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KOR_FDI	91.07318	7.974414	11.42067	0.0000
C	1.40E+11	5.55E+10	2.528950	0.0148
R-squared	0.730990	Mean dependent var		5.77E+11
Adjusted R-squared	0.725385	S.D. dependent var		5.44E+11
S.E. of regression	2.85E+11	Akaike info criterion		55.62743
Sum squared resid	3.89E+24	Schwarz criterion		55.70391
Log likelihood	-1388.686	Hannan-Quinn criter.		55.65655
F-statistic	130.4318	Durbin-Watson stat		0.699706
Prob(F-statistic)	0.000000			

Dependent Variable: KOR_GDPUSD
Method: Least Squares
Sample (adjusted): 1971 2020
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KOR_OFDI	42.43975	1.949036	21.77474	0.0000
C	2.06E+11	3.04E+10	6.755870	0.0000
R-squared	0.908071	Mean dependent var		6.09E+11
Adjusted R-squared	0.906155	S.D. dependent var		5.57E+11
S.E. of regression	1.71E+11	Akaike info criterion		54.60329
Sum squared resid	1.40E+24	Schwarz criterion		54.67977
Log likelihood	-1363.082	Hannan-Quinn criter.		54.63241
F-statistic	474.1393	Durbin-Watson stat		0.273205
Prob(F-statistic)	0.000000			

Dependent Variable: SGP_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SGP_FDI	3.761422	0.174857	21.51137	0.0000
C	2.88E+10	6.35E+09	4.535142	0.0000
R-squared	0.906019	Mean dependent var		1.09E+11
Adjusted R-squared	0.904061	S.D. dependent var		1.17E+11
S.E. of regression	3.63E+10	Akaike info criterion		51.50523
Sum squared resid	6.31E+22	Schwarz criterion		51.58171
Log likelihood	-1285.631	Hannan-Quinn criter.		51.53435
F-statistic	462.7390	Durbin-Watson stat		1.307671
Prob(F-statistic)	0.000000			

Dependent Variable: SGP_GDPUSD
Method: Least Squares
Sample (adjusted): 1972 2020
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SGP_OFDI	6.149292	0.433216	14.19451	0.0000
C	3.63E+10	9.52E+09	3.813937	0.0004
R-squared	0.810853	Mean dependent var		1.18E+11
Adjusted R-squared	0.806829	S.D. dependent var		1.21E+11
S.E. of regression	5.30E+10	Akaike info criterion		52.26479
Sum squared resid	1.32E+23	Schwarz criterion		52.34201
Log likelihood	-1278.487	Hannan-Quinn criter.		52.29409
F-statistic	201.4840	Durbin-Watson stat		2.156405
Prob(F-statistic)	0.000000			

Dependent Variable: JPN_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
JPN_FDI	92.07584	24.53858	3.752289	0.0005
C	2.80E+12	2.85E+11	9.805231	0.0000
R-squared	0.226800	Mean dependent var		3.36E+12
Adjusted R-squared	0.210692	S.D. dependent var		1.94E+12
S.E. of regression	1.72E+12	Akaike info criterion		59.22818
Sum squared resid	1.43E+26	Schwarz criterion		59.30466
Log likelihood	-1478.705	Hannan-Quinn criter.		59.25730
F-statistic	14.07967	Durbin-Watson stat		0.242077
Prob(F-statistic)	0.000472			

Dependent Variable: JPN_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2020
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
JPN_OFDI	20.44283	3.397984	6.016164	0.0000
C	2.32E+12	2.73E+11	8.524604	0.0000
R-squared	0.424844	Mean dependent var		3.39E+12
Adjusted R-squared	0.413106	S.D. dependent var		1.93E+12
S.E. of regression	1.48E+12	Akaike info criterion		58.92475
Sum squared resid	1.08E+26	Schwarz criterion		59.00051
Log likelihood	-1500.581	Hannan-Quinn criter.		58.95370
F-statistic	36.19422	Durbin-Watson stat		0.143048
Prob(F-statistic)	0.000000			

Dependent Variable: THA_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
THA_FDI	27.84026	3.310681	8.409224	0.0000
C	5.64E+10	1.88E+10	2.999409	0.0043
R-squared	0.595670	Mean dependent var		1.63E+11
Adjusted R-squared	0.587247	S.D. dependent var		1.53E+11
S.E. of regression	9.85E+10	Akaike info criterion		53.50388
Sum squared resid	4.66E+23	Schwarz criterion		53.58036
Log likelihood	-1335.597	Hannan-Quinn criter.		53.53301
F-statistic	70.71504	Durbin-Watson stat		1.085520
Prob(F-statistic)	0.000000			

Dependent Variable: THA_GDPUSD
Method: Least Squares
Sample (adjusted): 1975 2020
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
THA_OFDI	26.73372	2.070357	12.91261	0.0000
C	1.04E+11	1.25E+10	8.270938	0.0000
R-squared	0.791208	Mean dependent var		1.87E+11
Adjusted R-squared	0.786462	S.D. dependent var		1.58E+11
S.E. of regression	7.30E+10	Akaike info criterion		52.90808
Sum squared resid	2.35E+23	Schwarz criterion		52.98758
Log likelihood	-1214.886	Hannan-Quinn criter.		52.93786
F-statistic	166.7356	Durbin-Watson stat		1.036195
Prob(F-statistic)	0.000000			

Dependent Variable: VNM_GDPUSD
Method: Least Squares
Sample (adjusted): 1985 2019
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VNM_FDI	15.14967	0.643522	23.54182	0.0000
C	9.78E+09	4.33E+09	2.256332	0.0308
R-squared	0.943803	Mean dependent var		7.93E+10
Adjusted R-squared	0.942100	S.D. dependent var		7.80E+10
S.E. of regression	1.88E+10	Akaike info criterion		50.20318
Sum squared resid	1.16E+22	Schwarz criterion		50.29206
Log likelihood	-876.5556	Hannan-Quinn criter.		50.23386
F-statistic	554.2172	Durbin-Watson stat		0.698800
Prob(F-statistic)	0.000000			

Dependent Variable: VNM_GDPUSD
Method: Least Squares
Sample (adjusted): 1996 2019
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VNM_OFDI	99.07161	23.85076	4.153814	0.0005
C	6.37E+10	1.76E+10	3.624139	0.0017
R-squared	0.463147	Mean dependent var		1.14E+11
Adjusted R-squared	0.436305	S.D. dependent var		7.98E+10
S.E. of regression	5.99E+10	Akaike info criterion		52.55596
Sum squared resid	7.17E+22	Schwarz criterion		52.65514
Log likelihood	-576.1155	Hannan-Quinn criter.		52.57932
F-statistic	17.25417	Durbin-Watson stat		0.299560
Prob(F-statistic)	0.000491			

Dependent Variable: MYS_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MYS_FDI	25.25587	1.869460	13.50971	0.0000
C	1.20E+10	1.07E+10	1.119928	0.2683
R-squared	0.791768	Mean dependent var		1.15E+11
Adjusted R-squared	0.787430	S.D. dependent var		1.15E+11
S.E. of regression	5.32E+10	Akaike info criterion		52.27220
Sum squared resid	1.36E+23	Schwarz criterion		52.34868
Log likelihood	-1304.805	Hannan-Quinn criter.		52.30133
F-statistic	182.5123	Durbin-Watson stat		1.251818
Prob(F-statistic)	0.000000			

Dependent Variable: MYS_GDPUSD
Method: Least Squares
Sample (adjusted): 1974 2020
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MYS_OFDI	17.83129	1.806947	9.868187	0.0000
C	5.60E+10	1.23E+10	4.548464	0.0000
R-squared	0.683947	Mean dependent var		1.30E+11
Adjusted R-squared	0.676923	S.D. dependent var		1.18E+11
S.E. of regression	6.72E+10	Akaike info criterion		52.74260
Sum squared resid	2.03E+23	Schwarz criterion		52.82133
Log likelihood	-1237.451	Hannan-Quinn criter.		52.77222
F-statistic	97.38112	Durbin-Watson stat		0.296764
Prob(F-statistic)	0.000000			

Dependent Variable: PHL_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PHL_FDI	36.82671	2.545636	14.46660	0.0000
C	3.96E+10	8.00E+09	4.954107	0.0000
R-squared	0.813435	Mean dependent var		1.06E+11
Adjusted R-squared	0.809548	S.D. dependent var		1.06E+11
S.E. of regression	4.64E+10	Akaike info criterion		52.00014
Sum squared resid	1.04E+23	Schwarz criterion		52.07662
Log likelihood	-1298.004	Hannan-Quinn criter.		52.02927
F-statistic	209.2826	Durbin-Watson stat		0.451722
Prob(F-statistic)	0.000000			

Dependent Variable: PHL_GDPUSD
Method: Least Squares
Sample (adjusted): 1977 2020
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PHL_OFDI	52.70175	4.764128	11.06220	0.0000
C	5.88E+10	1.06E+10	5.551360	0.0000
R-squared	0.744483	Mean dependent var		1.27E+11
Adjusted R-squared	0.738399	S.D. dependent var		1.12E+11
S.E. of regression	5.72E+10	Akaike info criterion		52.42316
Sum squared resid	1.38E+23	Schwarz criterion		52.50426
Log likelihood	-1151.310	Hannan-Quinn criter.		52.45324
F-statistic	122.3723	Durbin-Watson stat		1.220222
Prob(F-statistic)	0.000000			

Dependent Variable: IDN_GDPUSD
Method: Least Squares
Sample (adjusted): 1970 2019
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IDN_FDI	38.79182	2.395464	16.19387	0.0000
C	1.08E+11	2.27E+10	4.769402	0.0000
R-squared	0.845282	Mean dependent var		3.03E+11
Adjusted R-squared	0.842058	S.D. dependent var		3.42E+11
S.E. of regression	1.36E+11	Akaike info criterion		54.14629
Sum squared resid	8.85E+23	Schwarz criterion		54.22277
Log likelihood	-1351.657	Hannan-Quinn criter.		54.17541
F-statistic	262.2413	Durbin-Watson stat		1.185056
Prob(F-statistic)	0.000000			

Dependent Variable: IDN_GDPUSD
Method: Least Squares
Sample (adjusted): 1980 2020
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IDN_OFDI	49.94921	12.38306	4.033674	0.0002
C	2.88E+11	5.42E+10	5.311083	0.0000
R-squared	0.294380	Mean dependent var		3.89E+11
Adjusted R-squared	0.276287	S.D. dependent var		3.62E+11
S.E. of regression	3.08E+11	Akaike info criterion		55.79102
Sum squared resid	3.70E+24	Schwarz criterion		55.87461
Log likelihood	-1141.716	Hannan-Quinn criter.		55.82146
F-statistic	16.27052	Durbin-Watson stat		0.493025
Prob(F-statistic)	0.000248			

Data Analysis

The results of linear regression of FDI and OFDI on GDP show positive and significant results in all ASEAN+3 countries and the US with varying coefficients. Based on the calculation of Johansen Test varied in each country, as follows the cointegrated variables:

CHN_GDPUSD-CHN_FDI, CHN_GDPUSD-CHN_OFDI, USA_GDPUSD-USA_FDI,
KOR_GDPUSD-KOR_FDI, SGP_GDPUSD-SGP_FDI, SGP_GDPUSD-SGP_OFDI,
MYS_GDPUSD-MYS_OFDI, PHL_GDPUSD-PHL_FDI, PHL_GDPUSD-PHL_OFDI,
VNM_GDPUSD-VNM_FDI, VNM_GDPUSD-VNM_OFDI, IDN_GDPUSD-IDN_FDI,
IDN_GDPUSD-IDN_OFDI.

The further research could be produced to make some detailed research of empirical association between inward foreign direct investment, outward foreign direct investment and economy growth in each country.

References

- Alfaro, Laura, Areendam Chanda, Sebnem Kalemli-Ozcan, and Selin Sayek. 2004. FDI and economic growth: The role of local financial markets. *J. Int. Econ.* 64: 89–112.
- Apergis, N. (2008). Foreign direct investment inward and foreign direct investment outward: Evidence from panel unit root and cointegration tests with a certain number of structural changes. *Global Economy Journal*, 8(1), 1850125.
- Backus, David K., Patrick J. Kehoe, and Finn E. Kydland. 1992. International real business cycles. *J. Political Econ.* 100: 745–75
- Basu, Parantap, Chandana Chakraborty, and Derrick Reagle. 2003. Liberalization, FDI, and growth in developing countries: A panel cointegration approach. *Econ. Inq.* 41: 510–16.
- Blomström, Magnus, Ari Kokko, and Mario Zejan. 1994. Host country competition, labor skills, and technology transfer by multinationals. *Rev. World Econ.* 130: 521–33.
- Borensztein, Eduardo R., José R. de Gregorio, and Jongwha Lee. 1998. How Does Foreign Direct Investment Affect Economic Growth? Available online: <https://www.nber.org/papers/w5057.pdf>
- Bosworth, Barry P., Susan M. Collins, and Carmen M. Reinhart. 1999. Capital flows to developing economies: Implications for saving and investment. *Brook. Pap. Econ. Act.* 1: 143–80.
- Buckley, Peter J., Jeremy Clegg, Chengqi Wang, and Adam Cross. 2002. FDI, regional differences and economic growth: Panel data evidence from China. *The challenge of international business. Transnatl. Corp.* 11: 1–28.
- Caves, Richard E. 1974. Multinational firms, competition, and productivity in host-country markets. *Economica* 41: 176–93.
- Chandana Chakraborty & Parantap Basu (2002) Foreign direct investment and growth in India: a cointegration approach, *Applied Economics*, 34:9, 1061-1073, DOI: 10.1080/00036840110074079
- Luiz R. de Mello Jr. (1997) Foreign direct investment in developing countries and growth: A selective survey, *The Journal of Development Studies*, 34:1, 1-34, DOI: 10.1080/00220389708422501
- Dinh, T. T. H., Vo, D. H., & Nguyen, T. C. (2019). Foreign direct investment and economic growth in the short run and long run: Empirical evidence from developing countries. *Journal of Risk and Financial Management*, 12(4), 176.
- Herzer, Dierk. (2008). The long-run relationship between outward FDI and domestic output: Evidence from panel data. *Economics Letters*, 100(1), 146-149.
- Herzer, Dierk. (2011): The long-run effect of outward FDI on domestic output in developing countries, *Applied Economics Letters*, 18:14, 1355-1358

- Jyun-Yi, Wu, and Hsu Chih-Chiang. 2008. Does foreign direct investment promote economic growth? Evidence from a threshold regression analysis. *Econ. Bull.* 15: 1–10.
- Keller, W., & Yeaple, S. R. (2009). Multinational enterprises, international trade, and productivity growth: firm-level evidence from the United States. *The review of economics and statistics*, 91(4), 821–831.
- Keller, Wolfgang, Yeaple, Stephen R; Multinational Enterprises, International Trade, and Productivity Growth: Firm-Level Evidence from the United States. *The Review of Economics and Statistics* 2009; 91 (4): 821–831. doi: <https://doi.org/10.1162/rest.91.4.821>
- Koojaroenprasit, Sauwaluck. 2012. The impact of foreign direct investment on economic growth: A case study of South Korea. *Int. J. Bus. Soc. Sci.* 3: 8–19.
- Larsson, R., Lyhagen, J., & Löthgren, M. (2001). Likelihood-based cointegration tests in heterogeneous panels. *Econometrics Journal*, 4(1), 109–142. doi:10.1111/1368-423x.00059
- Mansfield, Edwin, and Anthony Romeo. 1980. Technology transfer to overseas subsidiaries by US-based firms. *Q. J. Econ.* 95: 737–50.
- Markusen, James R., and Anthony J. Venables. 1999. Foreign direct investment as a catalyst for industrial development. *Eur. Econ. Rev.* 43: 335–56.
- Nguyen, Ha Minh, Ngoc Hoang Bui, and Duc Hong Vo. 2019. The Nexus between Economic Integration and Growth: Application to Vietnam. *Annals of Financial Economics* 14: 1950041.
- Omran, Mohammed, and Ali Bolbol. 2003. Foreign direct investment, financial development, and economic growth: Evidence from the Arab countries. *Rev. Middle East. Econ. Financ.* 1: 231–49.
- Desbordes, R., Franssen, L.; Foreign Direct Investment and Productivity: A Cross-Country, Multisector Analysis. *Asian Development Review* 2019; 36 (1): 54–79. doi: <https://doi.org/10.1162/adev.a.00123>
- Shahbaz, Muhammad, and Mohammad Mazur Rahman. 2010. Foreign capital inflows-growth nexus and role of domestic financial sector: An ARDL co-integration approach for Pakistan. *J. Econ. Res.* 15: 207–31.
- Tiwari, Aviral Kumar, and Mihai Mutascu. 2011. Economic growth and FDI in Asia: A panel-data approach. *Econ. Anal. Policy* 41: 173–87.
- Vo, Duc Hong, Anh The Vo, and Zhaoyong Zhang. 2019. Exchange Rate Volatility and Disaggregated Manufacturing Exports: Evidence from an Emerging Country. *J. Risk Financ. Manag.* 12: 12.